

### MAXIMUM AND MINIMUM TEMPERATURES.

The highest temperature reported by a regular station of the Signal Service was 97, at Rio Grande City, Tex., on the 24th. The maximum temperature was above 80 along the south part of the south Atlantic coast, in southeast Alabama, and in the west Gulf states, and was above 70 south of the Ohio and lower Missouri rivers, on the southeast slope of the Rocky Mountains, and in south California and southwest Arizona. The lowest maximum temperature was reported along the northern border of the country between the 95th and 119th meridians. The reports of United States Army post surgeons and voluntary observers show the following maximum temperatures in states and territories where temperature rising to or above 80 was reported: Fort Ringgold, Tex., 99; Eustis, Fla., 91; Vaiden, Miss., 86; Fort Sill, Okla. T., Florence, Ariz., and Cheneyville, La., 85; Volcano Springs, Cal., Louisville, Ga., and Fort Supply, Ind. T., 84; Jacksonborough, S. C., Richmond, Va., and Central City, Ky., 83; Citronelle, Ala., 82; Marshallberg, N. C., 81; and Englewood, Kans., 80. At the following-named stations of the Signal Service the maximum temperature was as high or higher than previously reported for February: Charleston, S. C., 80, the same as 1887; Savannah, Ga., 84, 3 above 1889; Jacksonville, Fla., 86, 2 above 1887; Atlanta, Ga., 78, 3 above 1889; Montgomery, Ala., 83, 2 above 1883; Galveston, Tex., 75, the same as 2 or more years; Rio Grande City, Tex., 97, 1 above 1887; Palestine, Tex., 82, the same as 1886; Shreveport, La., 81, the same as 1889; Fort Sill, Okla. T., 85, 6 above 1879; Little Rock, Ark., 78, the same as 2 or more years; Fort Smith, Ark., 80, 2 above 1883; Keokuk, Iowa, 70, 1 above 1882; and Escanaba, Mich., 41, the same as 2 or more years.

The lowest temperature reported by a regular station of the Signal Service was -36, at Fort Custer, Mont., on the 2d. The minimum temperature was below -30 over northwest Minnesota, north North Dakota, and east and central Montana, and was below zero over north New England, northeast New York, and north of a line traced from lower Michigan irregularly southwestward to south New Mexico, and thence irregularly northwestward to north Idaho. The minimum temperature was highest over extreme south Florida, where it was above 55, and it was 40 or above in extreme south Louisiana, at the mouth of the Rio Grande River, and at San Francisco, Cal. The reports of United States Army post surgeons and voluntary observers show the following minimum temperatures in the states and territories where temperature falling to or below zero was reported: Breckenridge and Gunnison, Colo., -46; Pine River, Minn., -44; Rhinelander, Wis., -40; Walpeton, N. Dak., -39; Powder River, Mont., -35; Henry's Lake, Idaho, -34; Fort Meade, S. Dak., -32; Cresco, Iowa,

and Fort Brady, Mich., -31; Fort Niobrara, Nebr., -30; West Milan, N. H., -28; Fairfield, Me., and Fort Fetterman, Wyo., -25; Halleck, Nev., -23; Monero, N. Mex., -22; Mount Pleasant and Nephi, Utah, -19; Chelsea and Saxton's River, Vt., -17; Turin, N. Y., -16; Truckee (2), Cal., -15; Cockrell and Lanark, Ill., and Pickering, Mo., -13; Heath, Mass., and La Fayette, Ind., -12; Seneca, Kans., -10; Dyberry, Pa., -7; Waterville, Wash., -6; Canton and New Hartford (1), Conn., -5; Lakeview, Oregon, -4; Garrettsville and Granville, Ohio, -2; Cooley's, Ariz., -1; Caddo, Ky., 0. At the following-named stations of the Signal Service the minimum temperature was as low or lower than previously reported for February: Fort Stanton, N. Mex., -3, 7 below 1884; Santa Fé, N. Mex., -6, 3 below 1880; and San Diego, Cal., 34, 1 below 1880.

### LIMITS OF FREEZING WEATHER.

The southern limit of freezing weather is shown on Chart IV by a line traced just inside the coast line at Hatteras, N. C., a line traced over north Florida, and a line traced just inside the west Gulf coast line. The western limit of freezing weather is shown by a line traced from Yuma, Ariz., northwestward inside the Pacific coast line to the 40th parallel.

### RANGES OF TEMPERATURE.

The greatest and least daily ranges of temperature are given in the table of Signal Service data. The greatest monthly ranges of temperature occurred along the northeast and middle-eastern slopes of the Rocky Mountains, where they exceeded 75, whence they decreased eastward to less than 45 on the southeast New England coast, southeast to less than 30 in extreme south Florida, to less than 45 on the middle Gulf coast, and to less than 50 on the west Gulf coast, westward to less than 25 on the middle Pacific coast, and to less than 20 on the north Pacific coast.

### FROST.

Frost was not reported as far south as in the preceding month. In January frost was noted in Florida as far south as Lee county on a number of dates, while for the current month no frost was reported in Florida south of the 29th parallel. In Texas it occurred in the lower Rio Grande valley in January, while in February it was not reported south of the 29th parallel. On the Pacific coast frost occurred as far south as San Diego, Cal., in January, while for the current month it was noted about 1° farther north. In the Gulf States and north Florida the cold weather of the 26th and 27th injured early fruit and vegetables, and at points in the east Gulf and south Atlantic states the temperature on the morning of the 27th was the lowest of the season.

### PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for February, 1891, as determined from the reports of nearly 2,000 stations, is exhibited on Chart III. In the table of Signal Service data the total precipitation and the departure from the normal are given for each Signal Service station. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

Monthly precipitation to exceed 10.00 was reported along the Pacific coast between the 39th and 45th parallels, in the interior of California between the 38th and 40th parallels, in Santa Cruz Co., Cal., and in San Diego Co., Cal., east and north of San Diego. In parts of California and Arizona the rainfall was remarkably heavy. In the extreme northwest part of California the precipitation exceeded 20.00; at Boulder Creek, Santa

Cruz Co., 34.03 was reported; and at Cuyamaca, San Diego Co., a depth of 32.20 was reported. The monthly precipitation also exceeded 10.00 in Yavapai Co., central Arizona, at Alta, Salt Lake Co., Utah, and in southeast Louisiana, central, northeast, and extreme south Mississippi, east-central and northwest Alabama, extreme north Georgia, extreme west North Carolina, and east Tennessee. At a number of stations in west Texas and east Colorado no precipitation was reported. The monthly precipitation was generally less than 0.50 in the Rio Grande Valley and on the east slope of the Rocky Mountains, and was less than 1.00 in areas between the 95th meridian and the Rocky Mountains, in northwest Ontario, and northeast and southwest Florida.

The precipitation was in excess of the February average on the Pacific coast south of the 45th parallel, over the northern, southern, and the west parts of the middle plateau regions, from the north part of the southern plateau northeastward to the upper lake region, thence southward over the middle and

upper Ohio valleys and the interior of the east Gulf states, in New England and the middle Atlantic states, and along the west Gulf coast; elsewhere the precipitation was deficient. The most marked departure above the normal precipitation occurred in northwest California and southwest Oregon, where it exceeded 6.00, and the monthly precipitation was more than 2.00 in excess on the Pacific coast south of the 43d parallel and over the greater part of Arizona. In east Tennessee and at Halifax, N. S., there was an excess of more than 4.00, and the excess exceeded 2.00 in an area extending from Lake Erie southward over the Ohio Valley and the interior of the east Gulf states, at New Orleans, La., and on the southeast New England and south New Jersey coasts. The greatest departure below the normal precipitation occurred on the extreme north Pacific coast, where it was more than 4.00, and the deficiency exceeded 2.00 in Arkansas, and at Charleston, S. C., and Jacksonville, Fla.

Considered by districts the average percentage of the normal in districts where the precipitation was in excess was about as follows: middle Pacific coast, 250 per cent.; south Pacific coast, 227 per cent.; southern plateau, 219 per cent.; Missouri Valley, 160 per cent.; middle Atlantic states, 146 per cent.; lower lake region, 145 per cent.; Ohio Valley and Tennessee, 144 per cent.; east Gulf states, extreme northwest, and northeast slope of the Rocky Mountains, 130 per cent.; northern plateau, 129 per cent.; upper lake region, 128 per cent.; New England, 120 per cent.; and middle plateau region, 108 per cent. In districts where the precipitation was deficient the percentage of the normal was about as follows: Rio Grande Valley, 38 per cent.; middle-eastern slope of the Rocky Mountains, 40 per cent.; Key West, Fla., 42 per cent.; west Gulf states, 60 per cent.; south Atlantic states, 76 per cent.; southeast slope of the Rocky Mountains, 77 per cent.; upper Mississippi valley, 81 per cent.; and north Pacific coast, 91 per cent.

At the following-named stations the precipitation for the current month was the greatest ever reported for February during the respective periods of observation: Wood's Holl, Mass., 2.81 in excess of the normal, and 0.24 greater than the greatest amount previously reported for February, noted in 1876; Albany, N. Y., 1.59 in excess, and 0.02 greater than in 1878; Charlotte, N. C., 2.57 in excess, and 0.52 greater than in 1884; Forsyth, Ga., 3.75 in excess, and 0.21 greater than in 1882; Chattanooga, Tenn., 4.80 in excess, and 1.49 greater than in 1884; Grand Coteau, La., 5.49 in excess, and 0.98 greater than in 1888; Saint Vincent, Minn., 1.60 in excess, and 1.01 greater than in 1889; Huron, S. Dak., 0.83 in excess, and 0.21 greater than in 1887; Fort Stanton, N. Mex., 0.94 in excess, and 0.57 greater than in 1888; Santa Fé, N. Mex., 1.23 in excess, and 0.31 greater than in 1874; Fort Apache, Ariz., 3.20 in excess, and 0.75 greater than in 1884; Yuma, Ariz., 2.08 in excess, and 0.81 greater than in 1877; Helena, Mont., 1.02 in excess, and 0.35 greater than in 1884; Fort Shaw, Mont., 1.42 in excess, and 0.79 greater than in 1886; Montrose, Colo., 0.57 in excess, and 0.15 greater than in 1880; and Roseburgh, Oregon, 6.89 in excess, and 2.26 greater than in 1890. The greatest precipitation reported for February in the upper Ohio valley and at Lake Erie stations occurred in 1887, when it was 3 to 5 in excess of the normal; on the Washington coast in 1885, when the precipitation was 5 to 7 in excess; in the middle Ohio valley, Maine, from the New Jersey coast southwestward over central North Carolina, and on the south Pacific coast in 1884, when the precipitation was 4 to 5 in excess in the middle Ohio valley, 3 to 5 in excess in Maine, and in the area extending from New Jersey to North Carolina, and 6 to 10 in excess on the south Pacific coast; in the middle Mississippi and lower Ohio valleys in 1882, when the precipitation was 4 to 6 in excess; from the southeast slope of the Rocky Mountains northeastward to the upper Mississippi and Red River of the North valleys and the lower part of the upper lake region, and over the northern plateau and the west part of the middle plateau in 1881, when the precipitation was

1 to 3 in excess from the southeast slope of the Rocky Mountains to the Red River of the North Valley, 3 to 4 in excess in the lower part of the upper lake region, and 1 to 2 in excess over the northern plateau and the west part of the middle plateau; in the lower Rio Grande valley in 1873, when the precipitation was 1 to 6 in excess; and on the south Atlantic coast in 1874, when the precipitation was 3 to 6 in excess.

At the following-named stations the precipitation for the current month was the least ever reported for February: Jacksonville, Fla., 2.89 deficient, and 0.02 less than the least amount previously reported for February, noted in 1887; Fort Smith, Ark., 2.68 deficient, and 0.94 less than in 1885; Palestine, Tex., 1.94 deficient, and 0.55 less than in 1884; Fort Sill, Okla. T., 1.34 deficient, and 0.09 less than in 1879; and Neah Bay, Wash., 4.50 deficient, and 0.56 less than in 1887. The least precipitation reported for February occurred over the northern plateau and generally on the north Pacific coast in 1889, when the precipitation was 1 to 2 deficient over the northern plateau, and 3 to 6 deficient on the north Pacific coast; on the middle Pacific coast in 1886, when the precipitation was 3 to 5 deficient; on the south Pacific coast in 1885, when the precipitation was 2 to 4 deficient; in the lower Rio Grande valley in 1884, when the precipitation was 1 to 2 deficient; in south Arizona in 1881, when the precipitation was 0.50 to 1 deficient; and in the upper Mississippi valley and thence eastward over the Ohio Valley, the Lake region, and parts of the middle Atlantic and New England states in 1877, when the precipitation was 1 to 4 deficient in the upper Mississippi valley, 3 to 5 deficient in the Ohio Valley, 2 to 4 deficient in the Lake region, and 2 to 3 deficient in parts of the middle Atlantic and New England states.

In 1891, when the precipitation was the heaviest reported for February in extreme southeast Mass., east-central N. Y., south-central N. C., south-central Tenn., east-central S. Dak., extreme northwest Minn., in N. Mex., west Colo., Ariz., southwest Mont., and west-central Oregon, it was the least ever reported in extreme northeast Fla., east Tex., west Ark., Ind. T., and at Neah Bay, Wash. In 1885, when it was the greatest reported for the month on the Wash. coast, it was the least noted for February on the south Pacific coast. In 1884, when it was the greatest in the middle Ohio valley, Me., from N. J. southwest to N. C., and on the south Pacific coast, it was the least in the lower Rio Grande valley. In 1881, when it was the greatest from the southeast slope of the Rocky Mountains northeastward to the upper Mississippi and Red River of the North valleys, over the lower part of the upper lake region, and over the northern plateau and the west part of the middle plateau, it was the least in south Ariz. In 1877, when it was the greatest in the lower Rio Grande valley, it was the least from the upper Mississippi valley to the Atlantic coast.

The seasonal precipitation, January and February, 1891, averaged about as follows: In the middle Atlantic and New England states the precipitation continued above the normal, and the rainfall was about  $\frac{1}{3}$  greater than usual. In the south Atlantic states and at Key West, Fla., the seasonal rainfall was  $\frac{1}{2}$  to  $\frac{3}{4}$  of the usual amount. In the east Gulf states the precipitation continued in excess, and the seasonal rainfall was more than  $\frac{1}{10}$  greater than the normal. In the lower Rio Grande valley the excess in January gave way to a deficiency in February, and the seasonal rainfall was somewhat deficient. In the Ohio Valley and Tennessee and the lower lake region the deficiency in January gave way to an excess in February, and the seasonal rainfall was about  $\frac{2}{10}$  greater than the normal in the Ohio Valley and Tennessee, and about  $\frac{1}{10}$  greater in the lower lake region. In the upper lake region the precipitation continued in excess and the seasonal rainfall was more than  $\frac{1}{10}$  greater than the normal. In the extreme northwest the deficiency in January was balanced by the excess in February, and the seasonal rainfall was normal. In the upper Mississippi valley the precipitation continued deficient, and the seasonal precipitation was about  $\frac{9}{10}$  of the usual amount.

In the Missouri Valley and on the northeast slope of the Rocky Mountains the precipitation continued in excess, and the seasonal precipitation was about  $\frac{1}{2}$  greater than the normal in the Missouri Valley, and about  $\frac{2}{5}$  greater on the northeast slope of the Rocky Mountains. On the middle-eastern and south-east slopes of the Rocky Mountains the excess in January gave way to a deficiency in February, and the seasonal rainfall was about  $\frac{1}{2}$  greater than the normal on the middle-eastern slope, and about  $\frac{2}{5}$  greater on the southeast slope. Over the southern plateau the deficiency in January gave way to a marked excess in February, and the seasonal rainfall was about  $\frac{2}{3}$  greater than usual. Over the middle and northern plateau the deficiency in January gave way to an excess in February, and the seasonal rainfall was about  $\frac{1}{3}$  of the usual amount. On the north Pacific coast the deficiency continued, and the seasonal rainfall was about  $\frac{2}{3}$  of the usual amount. On the middle and south Pacific coasts the very marked deficiency in January gave way to a large excess in February, and the seasonal rainfall was nearly  $\frac{1}{2}$  greater than the normal on the middle Pacific coast, and nearly  $\frac{2}{3}$  greater on the south Pacific coast.

### DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for February for a series of years; (2) the length of record during which the observations have been taken and from which the average has been computed; (3) the total precipitation for February, 1891; (4) the departure of the current month from the average; (5) and the extremes for February during the period of observation and the years of occurrence:

State and station.	County.	(1) Average for the month of Feb.	(2) Length of record.	(3) Total for Feb., 1891.	(4) Departure from average.	(5) Extremes for Feb.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
<i>Arkansas.</i>		<i>Inches</i>	<i>Years</i>	<i>Inches</i>	<i>Inches.</i>	<i>Inches.</i>		<i>Inches</i>	
Lead Hill.....	Boone.....	5.14	9	1.60	-3.54	10.93	1884	1.47	1885
<i>California.</i>									
Sacramento.....	Sacramento..	2.78	41	7.62	+4.84	8.50	1854	0.12	1852
<i>Connecticut.</i>									
Middletown.....	Middlesex....	3.99	28	6.09	+2.10	7.56	1887	1.14	1877
<i>Florida.</i>									
Merritt's Island..	Brevard.....	2.81	13	1.25	-1.56	6.01	1888	0.15	1882
<i>Georgia.</i>									
Forsyth.....	Monroe.....	4.36	17	8.11	+3.75	8.11	1891	1.19	1879
<i>Illinois.</i>									
Peoria.....	Peoria.....	2.05	35	1.90	-0.15	5.45	1887	0.06	1877
Riley.....	McHenry.....	2.08	40	1.65	-0.43	6.00	1862, '65	0.03	1877
<i>Indiana.</i>									
Logansport.....	Cass.....	3.86	15			9.01	1857	0.15	1868
Vevay.....	Switzerland..	2.78	25	3.89	+1.11	10.23	1884	0.40	1877
<i>Iowa.</i>									
Cresco.....	Howard.....	0.98	19	1.49	+0.51	1.88	1887	0.07	1877
Monticello.....	Jones.....	1.87	38	0.86	-1.01	4.62	1887	0.32	1877
Logan.....	Harrison.....	1.35	23	1.60	+0.25	5.30	1881	T.	1889
<i>Kansas.</i>									
Lawrence.....	Douglas.....	1.25	25	1.98	+0.73	4.60	1881	0.03	1870
Wellington.....	Sumner.....	1.06	12	2.05	+0.99	3.73	1883	0.15	1879
<i>Louisiana.</i>									
Grand Coteau.....	St. Landry...	2.93	8	8.42	+5.49	8.42	1891	1.37	1886
<i>Maine.</i>									
Orono.....	Penobscot...	4.16	21	2.93	-1.23	8.39	1876	1.20	1877
<i>Maryland.</i>									
Cumberland.....	Allegany.....	2.56	18	3.99	+1.43	4.92	1882	0.60	1877
<i>Massachusetts.</i>									
Amherst.....	Hampshire...	3.16	56	4.07	+0.91	6.69	1853	0.36	1877
Newburyport.....	Essex.....	4.50	11	4.83	+0.33	6.75	1886	0.30	1889
Somerset.....	Bristol.....	3.76	17	7.09	+3.33	8.70	1886	1.00	1877
<i>Michigan.</i>									
Kalamazoo.....	Kalamazoo...	2.64	15	3.35	+0.71	5.44	1881	0.12	1877
Thornville.....	Lapeer.....	2.04	14	3.94	+1.90	4.08	1884	0.00	1877
<i>Minnesota.</i>									
Minneapolis.....	Hennepin....	1.16	25	2.11	+0.95	2.80	1869	T.	1877
<i>Montana.</i>									
Fort Shaw.....	Lewis & Clarke	0.41	21	1.83	+1.42	1.83	1891	0.05	1877
<i>New Hampshire.</i>									
Hanover.....	Grafton.....	2.35	47	2.40	+0.05	7.67	1887	0.50	1865
<i>New Jersey.</i>									
Moorestown.....	Burlington..	3.47	27	5.28	+1.81	6.02	1886	0.53	1877
South Orange.....	Essex.....	3.78	20	4.88	+1.10	6.10	1881	1.10	1877
<i>New York.</i>									
Cooperstown.....	Otsego.....	2.16	37	4.76	+2.60	5.21	1887	0.60	1856
Palermo.....	Oswego.....	2.84	37	3.45	+0.61	7.20	1866	0.10	1877
<i>North Carolina.</i>									
Lenoir.....	Caldwell.....	4.27	19	6.60	+2.33	9.00	1873	0.60	1877
<i>Ohio.</i>									
N. Lewisburgh...	Champaign...	3.25	19	5.25	+2.00	8.20	1883	0.35	1872
Wauseon.....	Fulton.....	2.96	17	4.58	+1.62	7.19	1887	0.12	1877

### Deviations from average precipitation—Continued.

State and station.	County.	(1) Average for the month of Feb.	(2) Length of record.	(3) Total for Feb., 1891.	(4) Departure from average.	(5) Extremes for Feb.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
<i>Oregon.</i>		<i>Inches</i>	<i>Years</i>	<i>Inches</i>	<i>Inches.</i>	<i>Inches.</i>		<i>Inches</i>	
Albany.....	Linn.....	6.43	13	7.73	+1.30	13.08	1881	0.95	1889
Eola.....	Polk.....	5.53	21	7.09	+1.56	13.24	1872	0.35	1889
<i>Pennsylvania.</i>									
Dyersburg.....	Wayne.....	2.70	25	4.97	+2.27	5.59	1884	0.60	1877
Granberry Hills..	Clearfield....	3.46	19	7.01	+3.55	7.02	1887	1.56	1872
Wellsborough.....	Tioga.....	5.87	11	3.46	-2.41	10.93	1884	0.95	1887
<i>South Carolina.</i>									
Statesburgh.....	Sumter.....	2.72	9	3.07	+0.35	5.47	1889	1.18	1883
<i>Tennessee.</i>									
Austin.....	Wilson.....	5.47	22	7.18	+1.71	12.57	1887	0.75	1868
<i>Texas.</i>									
New Ulm.....	Austin.....	4.36	18	3.10	-1.26	10.90	1882	1.06	1885
<i>Vermont.</i>									
Stratford.....	Orange.....	2.88	17	3.30	+0.42	5.90	1887	0.30	1877
<i>Virginia.</i>									
Birdsnest.....	Northampton	3.47	22	5.10	+1.63	6.55	1884	1.40	1877
<i>Washington.</i>									
Fort Townsend....	Jefferson....	1.82	16	2.31	+0.49	3.94	1879	0.37	1886
<i>Wisconsin.</i>									
Madison.....	Dane.....	1.73	26	1.38	-0.35	7.90	1869	0.30	1877

### EXCESSIVE PRECIPITATION.

Monthly precipitation to equal or exceed 10.00 was reported at 41 stations in Cal.; at 9 stations in La.; at 6 stations in Ala. and Oregon; at 5 stations in Miss.; at 4 stations in Tenn.; at 3 stations in N. C.; at 2 stations in Ariz.; and at 1 station in Ga. and Utah. Among the heavier rainfalls reported were: 32.20, at Cuyamaca, Cal.; 34.03, at Boulder Creek, Cal.; and 20.20, at Highlands, N. C.

In the last 21 years precipitation to equal or exceed 10.00 has been reported in February for 12 years in Cal.; for 10 years in Wash. and Oregon; for 8 years in N. C., Tenn., and Tex.; for 6 years in Ala. and Ind.; for 5 years in Miss. and N. Y.; for 4 years in Fla. and Ga.; for 3 years in Ark., Conn., La., Ky., and Pa.; for 2 years in Ill., Mass., Ohio, R. I., and S. C.; and for 1 year in Kans., Mich., N. H., N. Mex., and Va. Among the heavier monthly rainfalls reported for this period are 22.85 at Cisco, and 20.70 at Summit, Cal., in 1887. Monthly precipitation to exceed 15.00 has been reported for 5 years in Cal.; for 3 years in Wash.; and for one year in Ga., Ind., La., N. Y., N. C., Oregon, S. C., Tenn., and Tex.

Precipitation to equal or exceed 2.50 in 24 hours was reported at 28 stations in Cal., and on 9 dates, the 14th to 18th and 21st to 24th; at 23 stations in La., and on 9 dates, the 1st, 11th to 16th, 19th, and 20th; at 9 stations in Ohio, and on 3 dates, the 15th to 17th; at 7 stations in Miss., and on 6 dates, the 2d, 6th, 7th, 12th, 13th, and 21st; at 5 stations in Ariz., and on 4 dates, the 17-18th, 22d, and 23d; at 7 stations in Tenn., and on 4 dates, the 3d, 8th, 9th, and 10th; at 4 stations in Ind. and Ill., on the 19-20th; at 4 stations in Ala., and on 6 dates, the 7th to 9th, 13th, 20th, and 21st; at 2 stations in Ga., and on 3 dates, the 7th, 20-21st; at 2 stations in Ky., and on 5 dates, the 1st, 8-9th, 20th, 21st; at 2 stations in Mich., and on 3 dates, the 17th and 19-20th; at 1 station in Colo., on the 19-20th; at 1 station in Ark., on the 1st; at 1 station in N. C., and on 3 dates, the 8-9th and 21st; at 1 station in Oregon, on the 12-13th; and at 1 station in Tex., on the 19-20th. Among the heavier rainfalls reported for this period were: 22.40, at Cuyamaca, Cal., 22-23d; 7.48 at Julian, Cal., 23d-24th; 6.65 at Oakland (1), Cal., 15th; 6.40 at Campo, Cal., 21st-22d; 6.10 at Vacaville (1), Cal., 14-15th; 7.55 at Maurepas, La., 15th; 6.24 at Luling, La., 13-14th; 6.45 at Farley's Camp, Ariz., 17-18th; 6.01 at Highlands, N. C., 8-9th; 5.82 at Mount Vernon Barracks, Ala., 13th; 5.26 at Athens (2), Ga., 7th; 5.00 at Kosciusko, Miss., 12-13th. At Stonewall Mine, Cal., 23.90 was reported from the 21st to 24th, inclusive, and at Emilie, La., 8.42 from the 12th to 14th.

In the last 21 years precipitation to equal or exceed 2.50 in 24 hours in February has been reported for 11 years in Ala. and Tex.; for 10 years in N. Y. and Tenn.; for 9 years in Ga.;

for 8 years in Ill.; for 7 years in Ark., Fla., La., and N. C.; for 5 years in Conn., Miss., Oregon, and Wash.; for 4 years in Ky., Ohio, and Pa.; for 3 years in Cal., Ind., Kans., Md., Mich., and Va.; for 2 years in Iowa, Me., Mass., and Mo.; and for 1 year in Ariz., the Dakotas, Del., N. J., R. I., S. C., and Wis. At Oneida, N. Y., 10.10 was reported on the 13th, 1874, and precipitation to equal or exceed 5.00 in 24 hours has been reported for 3 years in La. and Tenn.; and for 1 year in Cal., Conn., Miss., N. Y., Oregon, Tex., and Va.

Precipitation to equal or exceed 1.00 in 1 hour was reported at 2 stations in Tenn., and on 2 dates, the 3d and 9th; and at 1 station in Cal., on the 23d. At Cuyamaca, Cal., 7.00 was reported in 6 hours on the 23d. Remarkably heavy rainfall in 1 hour was not reported at regular stations of the Signal Service, and excessive rainfall for 5 and 10 minute periods is given in the table of "Maximum rainfall in one hour or less." In the last 21 years precipitation to equal or exceed 1.00 in one hour has been reported for 6 years in Tenn.; for 4 years in N. C.; for 3 years in Miss. and Tex.; for 2 years in Ala., Ark., and Cal.; and for one year in Fla., Ga., La., Mich., and Pa. Among the heavier rainfalls reported in one hour are: 1.93 in 30 minutes, at Louisville, Miss., 26th, 1890; 3.04 in 55 minutes, at Galveston, Tex., 27th, 1872; and 3.31, in 1 hour, at Galveston, Tex., 22d, 1888.

Q Table of excessive precipitation, February, 1891.

State and station.	Monthly rainfall in inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch or more, in one hour.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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Table of excessive precipitation—Continued.

State and station.	Monthly rainfall in inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
<i>Tennessee.</i>						
Andersonville	<i>Inches.</i>	<i>Inches.</i>		<i>Inches</i>	<i>h. m.</i>	
Chattanooga	10.30	3.77	9	1.15	0 50	9
Clinton	10.20	2.71	8, 9			
Dare		3.90	9, 10	1.75	1 00	3
Knoxville	10.15	2.97	8, 9			
Rockwood	11.24					
Rugby		2.50	9			
Sharps		2.66	3			
Springdale		3.20	9			
<i>Texas.</i>						
Fort Worth		2.80	19, 20			
<i>Utah.</i>						
Alta *	10.40					

Received too late to be used in general discussion for February, 1891.

<i>Alabama.</i>						
Childersburgh	11.69	3.00	9			
Florence	10.59					
Tallahas Falls	10.38	2.60	21			
Tuscaloosa	10.23					
<i>Colorado.</i>						
Cumbres	11.40					
<i>Mississippi.</i>						
Columbus		2.93	12-13			

Received too late for publication in January, 1891.

<i>Missouri.</i>						
Gordonville		4.10	11			

\* Estimated from snowfall of 104 inches. † 1263 Obs., 1891.

**MAXIMUM RAINFALL IN ONE HOUR OR LESS.**

The following table is a record of the heaviest rainfall during February, 1891, for periods of five and ten minutes and one hour, as reported by regular stations of the Signal Service furnished with self-registering gauges:

Station.	Maximum fall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
	Inch.		Inch.		Inch.	
Bismarck, N. Dak.*						
Boston, Mass.	0.03	3	0.06	3	0.25	3
Buffalo, N. Y.	0.03	25	0.05	25	0.15	25
Cincinnati, Ohio	0.05	25	0.10	25	0.25	25
Chicago, Ill.	0.01	16	0.02	16	0.09	16
Cleveland, Ohio	0.05	16	0.07	16	0.30	16, 25
Denver, Colo.*						
Detroit, Mich.	0.02	17	0.05	17	0.23	17
Dodge City, Kans.*						
Duluth, Minn.*						
Eastport, Me.	0.07	3	0.11	3	0.27	3
Galveston, Tex.	0.07	20	0.14	20	0.36	14
Jupiter, Fla.	0.10	23	0.20	23	0.55	23
Kansas City, Mo.*						
Key West, Fla.	0.02	22	0.04	22	0.18	22
Marquette, Mich.*						
Memphis, Tenn.	0.25	8	0.35	8	0.55	8
New York City	0.02	7	0.04	7	0.17	7
New Orleans, La.	0.15	3	0.22	3	0.69	3
Norfolk, Va.	0.10	21	0.25	21	0.90	21
Philadelphia, Pa.	0.10	17	0.11	17	0.18	9
Philadelphia Water Works	0.10	17	0.12	17	0.20	9
Portland, Oregon	0.06	11	0.07	11	0.25	12
Saint Louis, Mo.†						
Saint Paul, Minn.*						
San Diego, Cal.	0.15	24	0.20	24	0.50	24
San Francisco, Cal.†						
Savannah, Ga.	0.12	21	0.20	21	0.50	1
Washington City	0.03	3	0.05	3	0.20	3
Wilmington, N. C.	0.10	1	0.12	1	0.25	1, 19

\* No record on account of snow. † Not sufficient to register.

**SNOW (in inches and tenths).**

Chart V shows the depth of snowfall reported for the month. The greatest depth of snowfall reported was 120 at Rico, Colo.; 104 was reported at Alta, Utah; the snowfall exceeded 90 at Fort Lewis, Colo.; 80 at Cisco, Cal.; 50 at Era, Idaho, and Roscommon, Mich.; 40 in central N. Y., south-central and north-central Oregon, and extreme northwest Wyo.; 30 in southwest Mont., northeast Nev., north-central N. Mex., cen-

tral Wis., and south Vt.; 20 in an area extending from extreme west Me. to central N. Y., over the north part of the upper lake region and in north Wis., from northeast Cal. over the northern plateau region, in adjoining parts of northwest Oregon and southwest Wash., and at elevated stations in Colo., north N. Mex., and Nev.; and the monthly snowfall exceeded 10 in New England, N. Y., and northeast Pa., over the greater part of the upper lake region and thence over the middle Missouri valley, and generally over the middle and northern plateau regions and in the mountains of west Oregon and Wash. In the Atlantic coast states snow fell as far south as central Ga.; in the Gulf States to central Miss.; in northeast Tex.; in south N. Mex., and southeast Ariz.; and on the Pacific coast trace was reported in Cal. as far south as San Diego county.

The following shows the greatest depth of snow reported in the respective states and territories in February from 1882 to 1890, inclusive, with the year of occurrence: In 1890, Ala., Volunteer Springs, 22.0; Colo., Aspen, 44.0; Idaho, Fort Sherman, 43.2; Nebr., Kennedy, 19.0; N. Mex., Chama, 29.0; Oregon, Siskiyou, 46.0; Pa., Blue Knob, 31.0; Tex., Menardville, 12.0; Utah, Ogden, 34.0. In 1889, Ga., Athens, 7.5; N. Y., Lowville, 71.4; N. C., Mount Pleasant, 11.2; Ohio, Wauseon, 19.1; S. C., Belmont and Clinton, 14.0; W. Va., Middlebrook, 32.0; Wis., Portage, 61.0. In 1888, Mich., Sault de Ste. Marie, 56.5; Miss., Palo Alto, 1.0; Mont., Fort Maginnis, 36.5. In 1887, Cal., Cisco, 228.5; Me., Kent's Hill, 45.0; N. H., Quincy, 50.8; Vt., Strafford, 61.5; Wash., Port Angeles, 48.8; Wyo., Camp Sheridan, 46.5. In 1886, Ark., Lead Hill, 17.0; Ky., Richmond, 14.1; Mo., Pierce City, 15.0; Tenn., Austin, 21.0. In 1885, Ala., Greensborough, 6.5; Conn., North Colebrook, 23.0; Del., Delaware Breakwater, 8.1; Ill., Rockford, 25.0; Ind., Logansport, 23.2; Iowa, Muscatine, 24.2; Kans., Fort Scott, 15.5; N. J., Atlantic City, 22.0; N. Dak., Fort Buford, 26.1. In 1884, Nev., Fort McDermitt, 48.0; Minn., Chester, 36.0. In 1882, Washington, City, 14.2; Md., Deer Park, 24.0; Mass., Princeton, 44.0; R. I., New Shoreham, 25.3; Va., Fort Myer, 23.3.

In February, 1891, the first snow of the season was reported as follows: 9th, Olympia, Wash. 11th, Fort Canby, Wash. 14th, Roseburgh, Oregon, and mountains near Eureka, Cal. 21st, Keeler, Cal. 26th, Montgomery, Bermuda, Columbiana, Livingston, and Auburn, Ala.; Athens, Forsyth, and Milledgeville, Ga.; Vicksburg, Meridian, Greenville, Holly Springs, Vaiden, and Pontotoc, Miss.; Columbia and Statesburgh, S. C. On the 2d a heavy snow storm prevailed in the middle Missouri valley and the extreme northwest. On the 7th a heavy fall of snow occurred in north and east N. Y., causing damage to electric wires, &c. On the 8th a severe snow storm prevailed in west Nebr. and the adjoining parts of Wyo. and Colo. On the 16th heavy snow fell at Salt Lake City, Utah. On the morning of the 17th the snow that remained on the ground was covered with a yellowish-brown coating, and windows and clothing of persons who were out of doors between the hours of 9 p. m. and midnight of the 16th were spotted with the same substance; it resembled dust, and contained alkali and salt. On the 18th melting snow drifts in the neighborhood of Rapid City, S. Dak., revealed a large number of carcasses of frozen cattle. On the 20th drifting snow interrupted railroad traffic at Red Wing, Minn. On the 26th the first snow in 3 years fell at Meridian, Miss., and snow was quite general over the northern and central parts of the Gulf and south Atlantic states. A heavy snow storm prevailed over S. Dak. At the close of the month heavy snow was reported on the ground near Fort Du Chesne, Utah; telegraph lines were down, and the mail stage had been unable to run since the 22d. At Monero, N. Mex., the railroad was blockaded with snow, and no mail had been received from the east since the 16th.

Snowfall of 10.0, or more, was reported as follows, and in states and territories where the maximum depth was less than that amount, the station reporting the greatest is given: *Alabama*.—Valley Head, 0.21. *Arizona*.—Chiri Cahua Mountains, 4. *Arkansas*.—Brinkley, 2. *California*.—Cisco, 86;

Truckee (1), 67.2; Sisson, 48.2; Boca, 45; Susanville, 40.5; Fort Bidwell, 32.6; Walla Walla Creek, 30; Sims, 22.5; Towles, 15; Summit, 13.8. *Colorado*.—Rico, 120; Fort Lewis, 97; Dillon, 69.2; Breckenridge, 66.5; Stunner, 52.8; Leadville, 47.5; Climax, 43; Red Cliff, 37.7; Moraine, 30; Stamford, 19; Gunnison and Smoky Hill Mine, 17; Meeker, Parachute, and Villa Grove, 16; Arboles, 13.8; Fruita, 12; Delta and Lay, 11.5; Akron, 11.2; Burlington, Le Roy, and Sedgwick, 10. *Connecticut*.—Canton, 15; Mansfield, 14; New Hartford (1), 12.4; Falls Village and West Simsbury, 12; Southington, 11.5; Hartford (2), New Hartford (2), 11; Hartford (1), 10. *District of Columbia*.—Washington City, 1. *Georgia*.—Marietta, 0.3. *Idaho*.—Era, 51.8; Placerville, 49; Kootenai, 44; Henry's Lake, 42.9; Fort Sherman, 42.5; Payette, 29.5; Ruthburg, 22.1; Boise Barracks, 22. *Illinois*.—Rock Island Arsenal, 7.2. *Indiana*.—Crandall, 8. *Indian Ter.*—Fort Supply, trace. *Iowa*.—Manson, 18.8; Concord and Logan, 16; Hampton, 14.8; Sioux City, 12.8; Alta (1 and 2), 12; Cedar Falls, 11.7; Humboldt, 11.5; Larrabee, West Bend, and Charles City, 10. *Kansas*.—Lebo, 6.8. *Kentucky*.—Franklin, 5. *Maine*.—Kent's Hill, 20; Cornish, 19; Lewiston, 16; Portland, 15.3; Farmington, 14.5; Calais and Orono, 14; Eastport, 10.6; Fairfield and Fort Preble, 10. *Maryland*.—Gaithersburgh, 8. *Massachusetts*.—Florida and Groton (1), 26; Fitchburgh (2) and Gilbertville, 24; Fitchburgh (1), 23; Leominster, 22; Kendall Green and Leicester, 21; Newburyport (1), 20; Ludlow (1), Mount Nonotuck, Salem (2), and Wakefield, 19; Lawrence and Winchester, 18; Worcester (1), 17.8; Springfield Armory, 17.5; Amherst, Concord, Ludlow (2), and North Billerica, 17; Amherst Experimental Station (1 & 2), Chicopee and Worcester (2), 16; Fall River (1), 15.5; Milton, 15; Westborough, 14.8; Blue Hill (summit), 13.9; Boston and Fiskdale, 13.8; South Hingham, 13; Ashland and Randolph, 12; Dudley, 10.5; Somersett, 10.2; Roberts Dam, 10. *Michigan*.—Roscommon, 55.7; Atlantic, 47; Bear Lake, 31.9; Marquette, 30.8; Calumet, 28.5; Sault de Ste. Marie, 28.4; Rockland, 27.5; Gaylord, 27; Ivan, 26.5; Northport, 26; Gulliver Lake, 24.5; Bellaire, 24.2; Saint Ignace, 23.5; Fort Brady, 22.7; Fort Mackinac, 22; Alpena, 21.6; Lathrop, 19.8; Grayling, 19; Manistee, Caldwell, and Weldon Creek, 18; Crystal Falls and West Branch, 16.5; Buchanan and Olivet, 13; Alma, 12.5; Harrison, 12; Grand Haven, 11.2; Allegan, 10.3.

*Minnesota*.—Duluth, 21.8; Farmington and Minneapolis, 20; Northfield 19.7; Montevideo and Rolling Green, 18; Leech Lake and Pine River, 16.8; Crookston, 16.3; Pokegama Falls, 15.9; Mankato, 15.7; Red Wing, 15.2; Morris, 13.1; Moorhead and Fort Ripley, 13; Faribault, 12.5; Saint Paul, 12.3; Alma City, 11.9; Fort Snelling, 11.2; Saint Charles, 11; Sheldon, 10.8; Grand Meadow, 10. *Mississippi*.—Water Valley, 1. *Missouri*.—Sedalia, 10.2. *Montana*.—Helena, 30; Fort Missoula, 29.5; Virginia City, 27; Martinsdale, 25.5; Clifton, 20.5; Fort Assiniboine, 19.2; Fort Shaw, 18.3; Blackfeet Agency, 14; Fort Keogh, 10.3. *Nebraska*.—West Hill, 28.5; Genoa, 21.5; Oakdale, 21.2; Ericson, 20; Creighton, 19.5; Marquette, 16.5; Valentine, 15.5; Red Willow, 15; Bassett, 14; Hay Springs, 13.7; David City, Dunning, Fort Sidney, and Lincoln, 13; Ravenna, 12.1; Alliance and Grand Island, 12; Fort Robinson, 11; West Point, 10. *Nevada*.—Toano, 30; Fenelon, 24.8; Pioche, 23.4; Palmetto, 23; Lewer's Ranch, 18.2; Belmont, 17.5; Austin, 16.8; Carson City, 15.2; Palisade, 15; Geneva, 14; Ely, 12.2; Crane's Ranch, 12; Carlin, 11.2; Reno State University, 10.7; Halleck, 10. *New Hampshire*.—Groveton and Plymouth, 22; Nashua, 21.2; Concord and Walpole, 20; Manchester, 19.3; Berlin Mills, 19; North Conway, 18; Hanover (1) and West Milan, 17; Hanover (2), 16; Littleton, 14; Antrim, 10.5; Stratford, 10.

*New Jersey*.—Dover, 12.5. *New Mexico*.—Monero, 38.9. *New York*.—Turin, 42.2; Utica, 37.8; Le Roy, 34; Alabama, 27; Quaker Street, 26; Brookfield and Sand Bank, 25; Rochester, 24.6; Cooperstown, 24; Watervliet Arsenal, 23; Syracuse, 22.2; Schodack Depot, 22; New Lisbon, 21.2; Galway, 21; Easton, 20.5; Perry City, 20.4; Bethlehem Centre, 19;

Ogdensburg, 18.5; Wedgwood, 18.1; Oxford, South Canisteo, and Wappinger's Falls, 17.5; Oswego, 16.7; White Plains, 16.5; Deposit, 15.8; Boyd's Corners, Malone, and Potsdam, 15; Romulus, 14.2; Demster, 14; Baldwinsville and Plattsburgh Barracks, 13.5; Akron, 13.2; West Point, 12.1; Apulia and Middletown, 12; Arcade, 11.9; Palermo, 11.8; Newark Valley, 11.5; Chenango Forks and Pendleton Centre, 11; Buffalo, 10.8. *North Carolina*.—Bryson City, 5.2. *North Dakota*.—Wahpeton, 14; Fort Pembina, 10.6; Gallatin, 10.2. *Ohio*.—Demos, 7. *Oregon*.—Hood River, 46.2; Lakeview, 40.2; Lone Rock and Vernonia, 36; Hardman, 33.8; Joseph, 30.5; Deer Island and La Grande, 28; Silver Lake, 27.4; Telocaset, 26; Baker City, 24.4; Happy Valley, 24.3; The Dalles, 18.8; West Fork, 15.9; Eola, 12; Portland, 11.4; Pendleton, 10. *Pennsylvania*.—Pleasant Mount, 19.8; Dyerberry, 17.5; Blue Knob, 16; Salem Corners, 15.5; Nisbet and Blooming Grove, 15; Grampian Hills, 13.5; Eagle's Mere, 12.5; Le Roy, 12.3; Wilkes Barre, 11.7. *Rhode Island*.—Lonsdale, 14; Providence (1), 13; Providence (3), 12; Providence (2), 10. *South Carolina*.—Spartanburgh (1), trace.

*South Dakota*.—Oelrichs, 28; Parkston, 25; Webster, 24.5; Cross, 21.2; Spearfish, 21; Vermillion, 18; Wolsey, 16.2; Alexandria and Kimball, 16; Saint Lawrence, 14.5; Yankton, 13.8; Rapid City and Brookings, 13.5; Huron, 12.6; Aberdeen and Canton, 12; Howard, 11.2; De Smet, 11; Fort Randall, 10.8. *Tennessee*.—Springdale, 7. *Texas*.—Grapevine, 0.1. *Utah*.—Alta, 104; Park City, 72.5; Parowau, 19.7; Levan, 15.8; Mount Pleasant, 15.5; Nephi, 14; Losee, 13; Richfield, 12.8; Grouse Creek, 11.5; Beaver, 11.2; Ogden (2), 10.5. *Vermont*.—Jacksonville, 30; Strafford and Vernon, 27; Brattleborough, 26; Chelsea, 18; East Berkshire, 15.8; Lunenburg, 14.5; Saxton's River, 14; Hartland, 13; Cornwall, 12; Northfield, 10. *Virginia*.—Casanova, Lynchburgh, Staunton, and Woodstock, 2.0. *Washington*.—Spokane Falls, 23; Walla Walla, 19.2; Fort Simcoe, 16.1; Seattle, 14.2; Waterville, 12.5; Blakeley, 12.2; Chehalis, 12. *West Virginia*.—Ella, 3. *Wisconsin*.—Chippewa Falls, 35; Bayfield, 28; Embarrass and Wauzeka, 27; Menomonee and Eau Claire, 24; Greenwood, 23; Oconto, 22; Plover, 21.5; De Pere, 21; Medford (1), 20.8; Rhinelander, 20; Hayward, 19.5; Peshigo, 18.4; Hammond, Hillsborough, Medford (2), and Neillsville, 18; Green Bay, 17.6; Manitowoc, 16.5; Elroy and Amherst, 16; Portage, 15.5; Appleton (1), 15; Centralia, 14; Oshkosh and Phillips, 13; Butternut and Glasgow, 12; Milwaukee, 11.1. *Wyoming*.—Camp Sheridan, 40.8; Fort D. A. Russell, 13.2; Cheyenne, 10.

#### DEPTH OF SNOW ON GROUND AT CLOSE OF MONTH.

Chart IV shows the depth of snow reported on the ground at the close of the month. At elevated stations in central Colo. a depth of 60.0, or more, was reported. At stations in Idaho, upper Mich., northeast N. H., south N. H. and Vt., and south-central Pa., a depth of 30.0, or more, was reported; it exceeded 20.0 generally over Idaho, west Mont., and upper Mich., and at stations in central N. Y.; and it exceeded 10.0 in east-central N. Y., in New England, save in the south part, over the north part of the upper lake region, north Wis. and Minn., and generally over the northern plateau. Trace of snow was reported on the ground north of a line traced from N. J., southwestward to extreme north Ga., thence west-northwest to central Colo., thence southwest to west-central N. Mex., thence northwestward to extreme north-central Cal., and thence northward to northwest Wash.

#### HAIL.

Description of the more severe hail storms of the month is given under "Local Storms." Hail was reported as follows: 1st, Nev., Pa. 2d, Ariz., Ill., Mo. 6th, Oregon, Wash. 7th, N. Y., Pa. 8th, Ill., N. Y., Tenn. 9th, Ind., N. Y., Ohio, Pa., Tex., Wash. 11th, Wash. 12th, Cal., Pa., Wash. 13th, Pa. 14th, Oregon. 15th, Cal. 16th, Cal. 17th, Cal., Nev. 18th, Ariz., Cal., Pa., Wash. 19th, Cal., Mo., Pa. 20th, Cal., N. Y., Pa., Tex. 22d, Cal. 23d, Ariz., Cal., Mo. 24th, Ariz.,

Ark., Cal., Ill., Ky., Mo., Nev. 25th, Cal., Conn., Ind., Ky., Ohio., Pa., Tenn. 26th, N. C., N. Y., Pa. 28th, Ala., Miss., R. I.

## SLEET.

Description of the more severe sleet storms of the month is given under "Local storms." Sleet was reported as follows: 1st, Ill., Me., N. Y., Pa. 2d, Ill., Ind., Iowa, Mass., Mo., Pa. 3d, Ill., Me., N. Y., Ohio, Pa., Vt. 6th, Ark., Mass., Nev., N. J., N. Y., Pa., R. I. 7th, Conn., Kans., Mass., Nev., N. J., Ohio, Oregon, Pa. 8th, Iowa, Kans., Mo. 9th, Ark., Ill., Ind., Ky., La., Mich., Miss., Mo., N. Y., N. C., Ohio, Pa., Tenn., Vt. 10th, Me., N. Y., Vt., Wash. 11th, Wash. 12th, Kans., N. J., Pa., Va., Wash. 13th, N. J. 14th, Oregon. 15th, Colo.,

Utah. 16th, Colo., Iowa, Mo., N. J., Va., Wis. 17th, Colo., Ill., Iowa, Ky., Mich., N. J., N. Y., Utah. 18th, Ill., Ind., Iowa, Kans., Ky., Mo., Pa., R. I., Wis. 19th, Colo., Ill., Ind., Iowa, Kans., Ky., Md., Mich., Minn., Mo., Nebr., Ohio., Pa., S. Dak., Tex., Va., Wash. 20th, Conn., Ill., Iowa, Mass., Mich., Nebr., N. J., N. Y., Ohio, Oregon, Pa., Vt., Va., Wash., W. Va., Wis. 21st, Nebr., Pa., Vt. 22d, Colo., Oregon, Utah. 23d, Colo., Ill., Nev., N. Mex., Oregon, Utah, Wash. 24th, Ariz., Cal., Colo., Ill., Iowa, Kans., Minn., Nev., S. Dak., Wis. 25th, Colo., Mo., Wis. 26th, Ark., Conn., La., Md., Mass., Miss., N. J., N. C., Pa., Va. 27th, R. I., Utah, Va. 28th, Colo., Ill., Ky., Miss., Oregon, Tenn., Utah.

## WINDS.

The prevailing winds during February, 1891, are shown on Chart II by arrows flying with the wind. In New England, the Lake region, the upper Mississippi and Missouri valleys, and over the southern and middle plateau regions the winds were generally from southwest to northwest; in the middle Atlantic states, from the northwest; in Florida and the west Gulf states, from northeast to southeast; in the east Gulf states, the Rio Grande Valley, and on the north Pacific coast, from east to south; in the Ohio Valley, from south to west; in the extreme northwest, from northwest to north; on the northeast slope of the Rocky Mountains, over the northern plateau region, and on the middle Pacific coast, from southeast to southwest; on the southeast slope of the Rocky Mountains, from west to north; on the south Pacific coast, from west to northwest; and in the south Atlantic states, Tennessee, and on the middle-eastern slope of the Rocky Mountains, variable.

## HIGH WINDS (in miles per hour).

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Signal Service, as follows: 4th, 56, nw., at Wood's Holl, Mass. 7th, 55, e., at Block Island, R. I.; 65, n., at Fort McKinney, Wyo. 8th, 54, nw., at Valentine, Nebr.; 52, nw., at Fort Sully, S. Dak. 9th, 50, se., at Fort Canby, Wash. 12th, 60, sw., at Fort Canby, Wash. 13th, 52, se., at Red Bluff, Cal. 14th, 52, sw., at Winnemucca, Nev. 15th, 50, sw., at Chicago, Ill. 16th, 56, w., at Winnemucca, Nev. 20th, 52, s., at Lexington, Ky. 22d, 50, s., at Winnemucca, Nev.; 50, nw., at Kitty Hawk, N. C. 23d, 52, sw., at Chicago, Ill.; 58, sw., at Winnemucca, Nev. 24th, 50, sw., at Abilene, Tex.; 52, sw., at Winnemucca, Nev.; 53, se., at Lexington, Ky.; 60, sw., at Chicago, Ill. 25th, 52, w., at Chicago, Ill.; 52, n., at Abilene, Tex. 26th, 56, w., at Jacksonville, Fla. 28th, 50, s., at Winnemucca, Nev.

## LOCAL STORMS.

**7th.**—A severe sleet and snow storm caused great damage to electric wires in east-central, central, and south-central New York.

**8th.**—A heavy storm of wind and snow prevailed over Nebraska, west Iowa, South Dakota, and Minnesota, delaying railroad trains, and causing loss of life in Nebraska and South Dakota. At Valentine, Nebr., the storm was reported as one of the severest ever noted at that station. North and northwest winds of 30 to 52 miles per hour continued all day, and the snow drifted 4 to 10 feet deep. A soldier and 2 settlers were reported frozen to death 6 miles from the station. At North Platte, Nebr., the wind attained an extreme velocity of 60 miles. At Genoa, Nebr., the snow drifted 10 to 12 feet deep in places. At Elkton, S. Dak., a gale from the ne. reached about 80 miles per hour; 6 persons were lost in the storm and frozen to death. High north winds prevailed in San Bernardino county, Cal., causing considerable damage. The walls of the new sugar refinery at Chino were blown down, and many oranges were whipped from the trees by the wind. High northerly winds prevailed in the Santa Ana Valley, and

sand storms were reported in the Mojave and Colorado deserts. A sloop was wrecked off Catalina Island and 2 men lost.

**9th.**—At 3.30 p. m., central time, a tornado, moving n. 65° e., passed over Helena, Ala., damaging 10 buildings to the extent of about \$5,000. Heavy rain and heavy thunder prevailed before and light rain followed the passage of the storm. A whirling motion from right to left was observed; a roaring sound was heard, and articles were carried up. The path of greatest destruction was about 150 feet in width and about 2 miles in length. A severe storm was also reported at Talladega, Ala. At 3 p. m., central time, a storm moved northeast over Coaling, Ala., with thunder and lightning and heavy rain after its passage. A loud roaring sound was heard; the storm apparently revolved slowly from right to left and light articles were carried up. The width of the path of greatest destruction was about 500 yards. Timber in the centre of the path was generally prostrated in the direction the storm moved, although some trees were thrown outward. No persons were killed, but a number were injured. Several small buildings, valued at a few thousand dollars, were destroyed, and others were injured. The destruction of timber was very great. At Chattanooga, Tenn., heavy rain fell at intervals, flooding sewers. The rush of water into the artificial lake at the Electric Park, near the foot of Missionary Ridge, caused the embankment to give way, flooding the surrounding country. Railroads were seriously affected by washouts and landslides. At Bryson City, N. C., telegraphic communication was cut off and a bridge was carried away during a storm.

**11th.**—A severe wind storm, with thunder and rain, caused some damage to timber south of Soapstone Mount, N. C.

**12th.**—An unusually heavy storm visited Puget Sound at night, delaying boats.

**13-14-15th.**—A rain storm prevailed over north California and west Oregon on the 13th and 14th, swelling streams and causing washouts and landslides. At Red Bluff, Cal., the rain continued until midnight of the 15th, with a southeast gale. The abutments of 2 bridges were damaged, also the electric light plant. From midnight of the 14th to 7.05 a. m. of the 16th 6.07 inches of rain fell at Red Bluff, the greatest amount of precipitation noted for one storm in three years. The rainfall was also heavy in other parts of the state, and was of great benefit to the fruit crop.

**16th.**—A thunder-storm, with a shower of hail about the size of peas, occurred at Eureka, Cal., at 10 p. m., damaging electric wires. A severe wind storm was reported in Calaveras county, Cal.

**17th.**—High northwest winds and heavy snow prevailed in Minnesota. The snow drifted badly, delaying trains. A high e. wind, blowing 50 miles per hour, prostrated some timber at Lunenburg Vt.

**18-19th.**—A severe rain, sleet, and snow storm prevailed from Colorado to Indiana, prostrating electric wires. At Leavenworth, Kans., the damage to wires was estimated at \$3,000.

**20th.**—At Grand Haven, Mich., snow turned to rain which